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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/807,949

Filing Date: March 24, 2004

Appellant(s): ZHANG, TONG

J. Michael Johnson (Reg. No. 37,856)
For Appellant

EXAMINER'S ANSWER¹

This is in response to the appeal brief filed November 5, 2009 appealing from the Office action mailed June 16, 2009.

¹ Substance remains the same as the Examiner's Answer mailed on 02/23/2010. Changes are made the format of the answer. This version replaces all previous versions (which were held to be non-compliant by the Board of Patent Appeals).

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

- Claims 23-48 are rejected and pending.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(5) Summary of Claimed Subject Matter

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the subheading "WITHDRAWN REJECTIONS." New grounds of rejection (if any) are provided under the subheading "NEW GROUNDS OF REJECTION."

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant's brief.

(8) Evidence Relied Upon

6,125,229	DIMITROVA ET AL.	9-2000
2003/0068087	WU ET AL.	4-2003
6,549,643	TOKLU ET AL.	4-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(c) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

[R.1] Claims 23, 25, 26, 28-33, 36, 38, 39 and 41-46 are rejected under 35 U.S.C. 102(e) as being anticipated by Toklu et al. (“Toklu”) [US 6,549,643 B1].

Regarding claim 23, Toklu meets the claim limitations, as follows:

A key-frame extraction system *[fig. 1]*, comprising: video frame extractor (*i.e. 12*) that extracts each of a series of video frames (*i.e. segments*) from a video *[fig. 1; col. 5, ll. 39-44]*; a set of frame analyzers (*i.e. 15, 16, 17*) that obtain the series of video frames in parallel from the video frame extractor (*i.e. 12*), each frame analyzer selecting a corresponding set of candidate key-frames from the series by performing a different corresponding analysis on each video frame in the series such that the analyses are selected to detect multiple types of meaningful content in the video *[fig. 1; col. 5, l. 61-col. 6, l. 7]*; key-frame selector (*i.e. 18*) that obtains the corresponding candidate key-frames from each frame analyzer (*i.e. 15, 16, 17*) and arranges the candidate key-

frames into a set of clusters (*i.e. key frames in their respective segments*) and that selects one of the candidate key-frames (*i.e. reference key frame*) from each cluster (*i.e. segment*) as a key-frame for the video [*fig. 4; col. 13, ll. 60-66*].

Regarding claim 25, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the key-frame selector (*i.e. 18*) selects the key-frames by determining an importance score (*i.e. object motion*) for each candidate key-frame in each cluster (*i.e. segment*) [*fig. 4; col. 13, ll. 60-66*].

Regarding claim 26, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 25, wherein the key-frame selector (*i.e. 18*) determines the importance scores (*i.e. object motion*) by determining an image content (*i.e. region segmentation*) of each candidate key-frame [*fig. 4; col. 13, ll. 37-40*].

Regarding claim 28, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the key-frame selector (*i.e. 18*) selects the key-frames by determining an image quality (*i.e. object motion*) for each candidate key-frame in each cluster (*i.e. segment*) [*fig. 4; col. 13, ll. 60-66*]. [Note: Image quality used in this context has the same meaning as image feature. It should not be equated to high quality or low quality images].

Regarding claim 29, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the frame analyzers include a color histogram analyzer (*i.e. 17*) [fig. 1].

Regarding claim 30, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the frame analyzers (*i.e. 15, 16, 17*) include a color layout (*i.e. distribution or histogram*) analyzer (*i.e. 17*) [fig. 1].

Regarding claim 31, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the frame analyzers (*i.e. 15, 16, 17*) include a fast camera motion detector (*i.e. 15*) [fig. 1].

Regarding claim 32, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the frame analyzers (*i.e. 15, 16, 17*) include a camera motion tracker (*i.e. 15*) [fig. 1].

Regarding claim 33, Toklu meets the claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the frame analyzers (*i.e. 15, 16, 17*) include an object motion analyzer (*i.e. 15*) [fig. 1].

Regarding claims 36, 38, 39 and 41-46, all claimed limitations are set forth and rejected as per discussion for claims 23, 25, 26 and 28-33.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

[R.2] Claims 24, 27, 34, 37, 40 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toklu in view of Wu et al. (“Wu”) [US 2003/0068087 A1].

Regarding claim 24, Toklu meets the claim limitations as set forth in claim 23.

Toklu does not explicitly disclose the following claim limitations:

The key-frame extraction system of claim 23, further comprising an audio event detector that obtains the series of video frames from the video frame extractor and that selects a corresponding set of candidate key-frames from the series by performing an audio analysis on each video frame in the series and that provides the corresponding set of candidate key-frames to the key-frame selector.

However, in the same field of endeavor Wu discloses the deficient claim limitations, as follows:

The key-frame extraction system of claim 23, further comprising an audio event detector (*i.e. 501*) that obtains the series of video frames from the video frame extractor (*i.e. 40*) and that selects a corresponding set of candidate key-frames (*i.e. frames with human sounds*) from the series by performing an audio analysis on each video frame in the series and that provides the corresponding set of candidate key-

frames (*i.e. frames with human sounds*) to the key-frame selector (*i.e. 503*) [*paras. 0027 and 0041*].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Toklu with Wu to include audio analysis the motivation being to reduce the amount of image processing performed on the video data [*para. 0026*].

Regarding claim 27, Toklu meets the claim limitations as set forth in claim 25.

Toklu does not explicitly disclose the following claim limitations:

The key-frame extraction system of claim 25, wherein the key-frame selector determines the importance scores by determining an audio content of each candidate key-frame.

However, in the same field of endeavor Wu discloses the deficient claim limitations, as follows:

The key-frame extraction system of claim 25, wherein the key-frame selector (*i.e. 503*) determines the importance scores (*i.e. whether or not to process the frame*) by determining an audio content (*i.e. human sounds*) of each candidate key-frame [*paras. 0027 and 0041*].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Toklu with Wu to include audio analysis the motivation being to reduce the amount of image processing performed on the video data [*para. 0026*].

Regarding claim 34, Toklu meets the claim limitations as set forth in claim 23.

Toklu does not explicitly disclose the following claim limitations:

The key-frame extraction system of claim 23, wherein the frame analyzers include a human face detector.

However, in the same field of endeavor Wu discloses the deficient claim limitations, as follows:

The key-frame extraction system of claim 23, wherein the frame analyzers include a human face detector (*i.e. 503*) [*para. 0031*].

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Toklu with Wu to include face detection the motivation being human faces are most important users of video content [*para. 0005*].

Regarding claims 37, 40 and 47, all claimed limitations are set forth and rejected as per discussion for claims 24, 27 and 34.

[R.3] Claims 35 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toklu in view of Dimitrova et al. (“Dimitrova”) [US 6,125,229].

Regarding claim 35, Toklu meets the claim limitations as set forth in claim 23. Toklu does not explicitly disclose the following claim limitations:

The key-frame extraction system of claim 23, further comprising a user interface for displaying a set of video frames in the video previous to each key-frame and a set of video frames in the video subsequent to each key-frame and for obtaining a user selection of one or more of the video frames

However, in the same field of endeavor Dimitrova discloses the deficient claim limitations, as follows:

The key-frame extraction system of claim 23, further comprising a user interface for displaying a set of video frames in the video previous to each key-frame and a set of video frames in the video subsequent to each key-frame and for obtaining a user selection of one or more of the video frames [col. 12, ll. 59-67]

It would have been obvious to one with ordinary skill in the art at the time of invention to modify the teachings of Toklu with Dimitrova and include user input the reasoning being that user's desire should be taken into account.

Regarding claim 48, all claimed limitations are set forth and rejected as per discussion for claim 35.

(10) Response to Argument

GROUND 1: Summary of Appellant's Arguments

Regarding claims 23 and 36 appellant argues that Toklu does not teach:

- a. “obtains the corresponding candidate key-frames from each frame analyzer and arranges the candidate key-frames into a set of clusters” [Brief: page 21, para. 2].
- b. “selects one of the candidate key-frames from each cluster as a key-frame for the video” [Brief: page 21, para. 2].
- c. “a set of frame analyzers that obtain the series of video frames in parallel from the video frame extractor” [Brief: page 21, para. 2].
- d. “selecting multiple sets of candidate key frames” [Brief: page 21, para. 2].

- e. “performing in parallel a set of different analyses on each video frame in the video” [Brief: page 21, para. 2].

Regarding claims 25 and 38 appellant argues that Toklu does not teach

1. “the key-frame selector selects the key-frames by determining an importance score” [Brief: Page 23, Para. 3]

Regarding claims 26 and 39 appellant argues that Toklu does not teach

1. “key-frame selector determines the importance scores by determining an image content of each candidate key-frame” [Brief: Page 24, Para. 1].

Regarding claims 28 and 41 appellant argues that Toklu does not teach

1. “the key-frame selector selects the key-frames by determining an image quality for each candidate key-frame in each cluster” [Brief: Page 24, Para. 2].

Regarding claims 30 and 43 appellant argues that Toklu does not teach

1. “frame analyzers include a color layout analyzer” [Brief: Page 24, Para. 3].

Regarding claims 31 and 44 appellant argues that Toklu does not teach

1. “frame analyzers include a fast camera motion detector” [Brief: Page 25, Para. 2].

Regarding claims 33 and 46 appellant argues that Toklu does not teach

1. “the frame analyzers include an object motion analyzer ” [Brief: Page 25, Para. 3].

GROUND 1: Examiner's Response

Regarding claims 23 and 36 Examiner contends that Toklu does teach:

- a. “obtains the corresponding candidate key-frames from each frame analyzer and arranges the candidate key-frames into a set of clusters” because key-frame selector (*i.e. 18*) obtains the corresponding candidate key-frames from each frame analyzer (*i.e. 15, 16, 17*) and arranges the candidate key-frames into a set of clusters (*i.e. key frames corresponding to respective segments*) *See fig. 4; col. 13, ll. 60-66.*
- b. “selects one of the candidate key-frames from each cluster as a key-frame for the video” because key-frame selector (*i.e. 18*) selects one of the candidate key-frames (*i.e. reference key frame*) from each cluster (*i.e. key frames corresponding to respective segments*) as a key-frame for the video. *See fig. 4; col. 13, ll. 60-66.* That is, the key frames from each video segment are further reduced to a single reference key frame to represent that segment.
- c. “a set of frame analyzers that obtain the series of video frames in parallel from the video frame extractor” because a set of frame analyzers (*i.e. 15, 16, 17*) obtain the series of video frames in parallel (*i.e. video data is input directly into each of 15, 16, 17 and in contradistinction with “series” where input of one module will depend on the output of another module*) from the video frame extractor (*i.e. 12*) *See fig. 1; col. 5, l. 61-col. 6, l. 7.*
- d. “selecting multiple sets of candidate key frames” because each frame analyzers (*i.e. 15, 16, 17*) obtains a set of candidate key frames. *See fig. 1; col. 5, l. 61-col. 6, l. 7.*

- e. “performing in parallel a set of different analyses on each video frame in the video” because each frame analyzers (*i.e. 15, 16, 17*) performs a different analysis in parallel. *See fig. 1; col. 5, l. 61-col. 6, l. 7.*

Regarding claims 25 and 38 Examiner contends that Toklu does teach

1. “the key-frame selector selects the key-frames by determining an importance score” because the key-frame selector (*i.e. 18*) selects the key-frames by determining an importance score (*i.e. object motion*) *See fig. 4; col. 13, ll. 60-66.*

Regarding claims 26 and 39 Examiner contends that Toklu does teach

1. “key-frame selector determines the importance scores by determining an image content of each candidate key-frame” because key-frame selector (*i.e. 18*) determines the importance scores (*i.e. object motion*) by determining an image content (*i.e. region segmentation*) of each candidate key-frame *See fig. 4; col. 13, ll. 37-40.*

Regarding claims 28 and 41 Examiner contends that Toklu does teach

1. “the key-frame selector selects the key-frames by determining an image quality for each candidate key-frame in each cluster” because the key-frame selector (*i.e. 18*) selects the key-frames by determining an image quality (*i.e. object motion; Image quality used in this context has the same meaning as image feature*) for each candidate key-frame in each cluster (*i.e. segment*) *See fig. 4; col. 13, ll. 60-66.*

Regarding claims 30 and 43 Examiner contends that Toklu does teach

1. “frame analyzers include a color layout analyzer” because frame analyzers (*i.e. 15, 16, 17*) include a color layout (*i.e. distribution or histogram*) analyzer (*i.e. 17*). *See fig. 1*

Regarding claims 31 and 44 Examiner contends that Toklu does teach

1. “frame analyzers include a fast camera motion detector” because the frame analyzers (*i.e. 15, 16, 17*) include a fast camera motion detector (*i.e. 15*). *See fig. 1*.

Regarding claims 33 and 46 Examiner contends that Toklu does teach

1. “the frame analyzers include an object motion analyzer ” because frame analyzers (*i.e. 15, 16, 17*) include an object motion analyzer (*i.e. 15*). *See fig. 1.*

GROUND 2: *Summary of Appellant's Arguments*

Regarding claims 24, 27, 34, 37, 40 and 47 appellant argues that there is no motivation to combine because

- a. There would be no reduction in image processing by including audio analysis of Wu because no face detection is performed. [Brief: Page 28, Para. 2].
- b. Human faces are not most important to users of video content. [Brief: Page 29, Para. 2]

GROUND 2: *Examiner's Response*

Regarding claims 24, 27, 34, 37, 40 and 47 Examiner contends that there is motivation to combine because

- a. Reduction in image processing would occur by including audio analysis of Wu because frames with silence or noise would not be processed. By eliminating those frames from processing, computational load is reduced. *See* Wu at Para. 0027.
- b. Human faces are most important to users of video content. *See* para. 0005 of Wu.

GROUND 3: *Summary of Appellant's Arguments*

Regarding claims 35 and 48 appellant argues that there is no reasoning to combine because the Examiner's reasoning of taking into account user's desire is conclusory. [Brief: Page 33, Para. 3]

GROUND 3: *Examiner's Response*

Regarding claims 35 and 48 Examiner contends that there is reasoning to combine because utilizing a user input would predictably result an improved system by taking into account a user's desire. *See KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Sath V Perungavoor/

Examiner, Art Unit 2624

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/Matthew C Bella/

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